SCHOTTKY DIODE WITH HIGH FIELD BREAKDOWN AND LOW REVERSE LEAKAGE CURRENT

Abstract of the Invention

A Schottky diode structure and a method of making the same are disclosed. The method comprises following steps: firstly, a semiconductor substrate having a first conductive layer and an epi-layer doped with the same type impurities is provided. Then a first oxide layer is form on the epi layer. A patterning step to pattern first oxide layer and recess the epi layer (optional) is then followed to define guard rings. After stripping the photoresist pattern, a polycrystalline silicon layer formation is then followed. A boron and/or BF_2^+ ion implant is then performed. Subsequently, a high temperature drive in process and oxidation process to oxidize the polycrystalline silicon layer and drive ions is then carried out. A second mask and etch steps are then performed to open the active regions. A metallization process is then done. A third mask and etch steps are then implemented to define anode. Finally, a backside metal layer is then formed and serves as a cathode.